What is claimed is:

1. An apparatus for flexibly suspending a sensing mechanism between a pair of cover plates, the apparatus comprising:

a sensing mechanism formed in a crystalline substrate;

a pair of cover plates formed in respective crystalline substrates and mounted on either side of the sensing mechanism;

a first plurality of complementary interfaces between the sensing mechanism and a first one of the cover plates; and

a second plurality of complementary interfaces flexibly suspended between the sensing mechanism and a second one of the cover plates, one or more of the flexibly suspended interfaces further comprising a complementary male and female interface.

2. The apparatus of claim 1 wherein one or more of the second plurality of complementary interfaces further comprises a complementary interface that is flexibly deflectable away from the sensing mechanism for exerting a preload on the sensing mechanism.

3. The apparatus of claim 1 wherein the first plurality of complementary interfaces further comprises a plurality of complementary interfaces fixed relative to the sensing mechanism and the first one of the cover plates.

4. The apparatus of claim 1 wherein the first plurality of the complementary interfaces further comprises a plurality of mesas interfacing with a plurality of flats.

5. The apparatus of claim 1 wherein the first plurality of the complementary interfaces further comprise an absolute reference plane.

6. The apparatus of claim 1 wherein each of the pair of cover plates further comprises a cavity formed by a base and a wall extended along the edges of the base, the walls of the pair of cover plates interconnected along a centerline of the sensing mechanism to form a cavity for housing the sensing mechanism,

the first plurality of complementary interfaces being fixed between the sensing mechanism and the base of the first one of the cover plates, and

the second plurality of complementary interfaces being flexibly suspended between the sensing mechanism and the base of the second one of the cover plates; and

further comprising a bond joining the walls of the pair of cover plates.

7. A micro-machined electromechanical system (MEMS) device having a micro-machined strain isolation apparatus, the MEMS device comprising:

a micro-machined electromechanical force sensing mechanism formed in a crystalline silicon substrate, the sensing mechanism including a plurality of interfaces formed in first and second opposing surfaces of a frame portion thereof;

first and second micro-machined cover plates formed in respective crystalline silicon substrates, each of the cover plates being formed with a substantially planar base portion between a plurality of upright walls that are spaced apart to admit the sensing mechanism and sized to form a cavity for housing the sensing mechanism when joined together;

a plurality of mesas being distributed between the base portion of the first cover plate in juxtaposition to a plurality of complementary flats formed in a first surface of a frame portion of the sensing mechanism;

a plurality of flexibly suspended complementary strain isolation devices being distributed between the base portion of the second cover plate and a second opposing surface of the frame portion of the sensing mechanism; and

an adhesive bond joining the walls of the first and second cover plates.

8. The strain isolation apparatus of claim 7 wherein one or more of the plurality of flexibly suspended complementary strain isolation devices further comprise a truncated male projection in juxtaposition to a complementary female indentation.

9. The strain isolation apparatus of claim 7 wherein one or more of the plurality of flexibly suspended complementary strain isolation devices are further sized to preload the sensing mechanism.

10. The strain isolation apparatus of claim 7 wherein the plurality of complementary strain isolation devices further comprise a plurality of flexible suspension brackets formed in the base portion of the second cover plate.

11. The strain isolation apparatus of claim 7 wherein the plurality of complementary strain isolation devices further comprise a plurality of flexible suspension brackets formed in the frame portion of the sensing mechanism.

12. The strain isolation apparatus of claim 7 wherein the upright walls are further sized to join along a centerline of the sensing mechanism.

13. A micro-machined electromechanical system (MEMS) device, comprising:

a plurality of crystalline wafers each having first and second substantially planar and parallel spaced apart opposing surfaces;

first and second clamshell covers formed in first and second ones of the crystalline wafers, the clamshell covers each comprising a substantially planar base portion surrounded by upright peripheral wall portions;

a micro-machined electromechanical sensing mechanism formed in a third one of the crystalline wafers, the sensing mechanism comprising a frame portion sized to fit within the upright peripheral wall portions of the first and second clamshell covers and a proof mass formed within the frame portion and flexibly suspended therefrom;

a first plurality of complementary interfaces positioned between the frame portion of the sensing mechanism and the base portion of the first clamshell cover and being fixed relative to one of the frame portion and the first clamshell cover; and

a second plurality of complementary interfaces positioned between the frame portion of the sensing mechanism and the base portion of the second clamshell cover and being flexibly suspended relative to one of the frame portion and the second clamshell cover.

14. The device of claim 13 wherein one of the second plurality of complementary interfaces further comprises a truncated pyramid shaped male projection interfaced with a complementary female socket.

15. The device of claim 13 wherein each of the second plurality of complementary interfaces further comprises a flexible Z-shaped suspension bracket.

16. The device of claim 13 wherein the second plurality of complementary interfaces further comprises a plurality of flexible suspension brackets formed in the second clamshell cover.

17. The device of claim 13 wherein the second plurality of complementary interfaces further comprises a plurality of flexible suspension brackets formed in the frame portion of the of the sensing mechanism.

18. The device of claim 13 wherein the first plurality of complementary interfaces further comprises a plurality of mesas interfaced with a plurality of complementary flats.

19. The device of claim 18 wherein the plurality of mesas further comprise a reference plane relative to the first clamshell cover.

20. A method for strain isolating a micro-machined sensing mechanism in a micro-machined electromechanical system (MEMS) device, the method comprising:

forming a micro-machined electromechanical sensing mechanism in a substantially planar crystalline substrate;

forming a pair of cover plates in a pair of substantially planar crystalline substrates;

forming in the sensing mechanism and in a first of the cover plates a plurality of complementary interfaces positioned between the sensing mechanism and of the first cover plate;

forming in the sensing mechanism and in a second of the cover plates a plurality of complementary interfaces flexibly suspended between the sensing mechanism and the second cover plate; and

interconnecting the pair of cover plates.

21. The method of claim 20 wherein forming one or more of the flexibly suspended complementary interfaces further comprises etching of a {1,0,0} surface of the crystalline substrate.

22. The method of claim 21 wherein forming one or more of the flexibly suspended complementary interfaces by etching of a {1,0,0} surface of the crystalline substrate further comprises:

etching a truncated pyramid shaped male projection in either the sensing mechanism or the second cover plate, and one of:

etching a complementary female socket in the sensing mechanism when the truncated pyramid shaped male projection is formed in the second cover plate, and

etching a complementary female socket in the second cover plate when the truncated pyramid shaped male projection is formed in the sensing mechanism.

23. The method of claim 22 wherein etching the truncated pyramid shaped male projection and the complementary female socket further comprise etching with an anisotropic etchant.

24. The method of claim 20 wherein forming a plurality of complementary interfaces flexibly suspended between the sensing mechanism and the second cover plate further comprises forming a flexible suspension bracket at each of the complementary interfaces for flexibly suspending the complementary interfaces.

25. The method of claim 20, further comprising generating a preload between the sensing mechanism and each of the pair of cover plates at one or more of the complementary interfaces.

26. The method of claim 20 wherein forming a plurality of complementary interfaces positioned between the sensing mechanism and the first cover plate further comprises forming a plurality of complementary plateau-to-flat interfaces between the sensing mechanism and the first cover plate.

27. The method of claim 26 wherein forming a plurality complementary plateau-to-flat interfaces positioned between the sensing mechanism and the first cover plate further comprises generating a reference plane defined by end surfaces of a plateau portion of the plateau-to-flat interfaces.

28. The method of claim 20 wherein interconnecting the pair of cover plates further comprises bonding the pair of cover plates along a centerline of the sensing mechanism.

29. The method of claim 20 wherein forming a pair of cover plates in a pair of substantially planar crystalline substrates further comprises forming in each of the cover plates a cavity formed by a base and an upright wall along the edges of the base, each cavity being sized to partially admit the sensing mechanism and the walls being interconnected

along a centerline of the sensing mechanism to form a cavity sized for housing the sensing mechanism.